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HIGH-VOLTAGE PULSE GENERATOR.(U)
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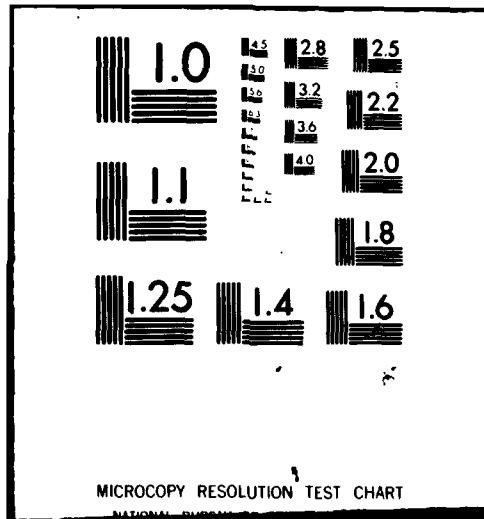UNCLASSIFIED   FTD-ID(RS)I-1176-76

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HIGH-VOLTAGE PULSE GENERATOR

by

V. N. Safronov

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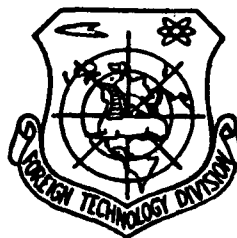
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HIGH-VOLTAGE PULSE GENERATOR

By: V. N. Safronov

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HIGH-VOLTAGE PULSE GENERATOR

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The invention concerns the technology of shaping high-voltage pulses of nanosecond duration and can be used during physical investigations of the dielectric strength of dielectrics.

A high-voltage pulse generator operating cn multiplication of the voltage at the capacitors and including capacitor banks, three-electrode interstep dischargers, and commutators of load and cable is krown.

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However, this generator does not guarantee simultaneous shaping
of high-voltage pulses of varied amplitude with nanosecond duration
at several loads.

The purpose of the invention is the simultaneous shaping of
high-voltage pulses of varied amplitude with nanosecond duration at
several loads from one generator.

This goal is achieved as follows: a section of cable is
connected between the middle electrode of each interstep discharger
and the load commutator.

A schematic of the generator is depicted in the diagram.

The generator contains unit 1 for charging capacitor banks 2-4;
resistors 5-8; three-electrode interstep dischargers with the first
discharge gaps 9, 10 and the second discharge gaps 11, 12; cables 13,
14; and commutators 15, 16 for loads 17, 18; unit 1 is connected
directly to the first electrode of bank 2, while banks 3, 4 are
connected across resistors 5, 6, respectively. The second electrode
of bank 2 is connected to the housing of the generator; it is
connected across resistors 7, 8 to the second electrodes of banks 3
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and 4, respectively, which are themselves connected to the first electrodes of banks 2 and 3 across discharge gaps 9, 11 and 10, 12, respectively. The middle electrodes of the interstep dischargers are connected across the central leads of cables 13, 14, the braids of which are attached to the housing, and then to loads 17 and 18 across commutators 15 and 16, respectively.
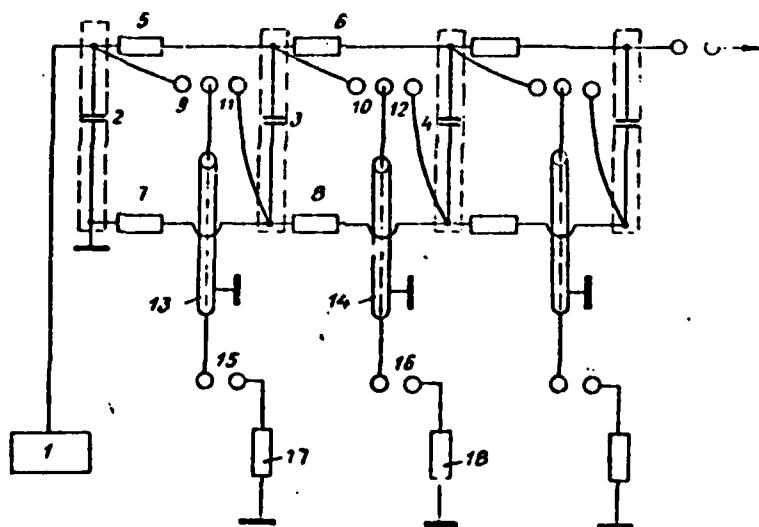
The generator works in the following manner.

Unit 1 charges banks 2-4 across resistors 5-8. Discharge gap 9 breaks down and bank 2 discharges onto cable 13, the voltage on which is raised, causing the sparkover of gap 11; as a result, banks 2 and 3, which are connected in series by gaps 9, 11, discharge across gap 10. Simultaneously the incident wave passes along cable 13, the voltage of which is doubled at its end which is isolated from load 17 by commutator 15, as a result of which the latter breaks down, and on load 17 a square wave is formed whose duration is determined by the length of cable 13.

An analogous process occurs after the sparkover of gap 10; here, the pulse on load 18 is of greater amplitude as compared with the indicated pulse, while its duration is determined by the length of cable 14. Analogous processes occur in the successive stages of the generator.

Object of the Invention

This high-voltage pulse generator operating on multiplication of the voltage at the capacitors and including capacitor banks, three-electrode interstep dischargers, and commutators of load and cable is distinguished by the fact that for simultaneous shaping of high-voltage pulses of varied amplitude with narosecond duration at several loads from one generator, a section of cable is connected between the middle electrode of each interstep discharger and load commutator.

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